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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/743,528	03/29/2001	Ib Dybkjaer	07089.0010U1	4036
23859	7590	12/01/2004	EXAMINER	
NEEDLE & ROSENBERG, P.C.			RIDLEY, BASIA ANNA	
SUITE 1000			ART UNIT	
999 PEACHTREE STREET			PAPER NUMBER	
ATLANTA, GA 30309-3915			1764	

DATE MAILED: 12/01/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/743,528

Applicant(s)

DYBKJAER ET AL.

Examiner

Basia Ridley

Art Unit

1764

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 30 August 2004.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1 and 2 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1 and 2 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- ☐ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 030104.
- ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- ☐ Notice of Informal Patent Application (PTO-152)
- ☐ Other: _____.

DETAILED ACTION

Information Disclosure Statement

1. The information disclosure statement filed on 1 March 2004 fails to comply with 37 CFR 1.98(a)(2), which requires a legible copy of each U.S. and foreign patent; each publication or that portion which caused it to be listed; and all other information or that portion which caused it to be listed. It has been placed in the application file, but the following document(s) referred to therein have not been considered as to the merits:

- JP 48-084808;
- JP 52-065190.

Claim Rejections - 35 USC § 103

2. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

3. Claims 1-2 are rejected under 35 U.S.C. 103(a) as being unpatentable over Dybjkær ("Tubular Reforming and Autothermal Reforming of Natural Gas - An Overview of Available Processes") in view of Igarashi et al. (USP 5,167,865).

Regarding claim 1-2, Dybjkær, in Fig. 13, discloses a process for preparation of hydrogen and carbon monoxide rich gas, the process comprising the steps:

- passing a process gas of hydrocarbon feedstock ("Natural Gas Feed") through a first reactor ("Prereformer") with steam reforming catalyst in a heat conducting relationship with a hot gas stream of flue gas (see Fig. 13; page 98, Section 4; and page 99, Section 5);
- passing effluent from the first reactor to a subsequent tubular reactor ("Primary Reformer") being provided with a steam reforming catalyst and being heated by burning of fuel, thereby

obtaining a partially steam reformed gas effluent and the hot gas stream of flue gas (see Fig. 13, page 98, Section 4 and pages 88-89, Section 3.1);

- passing the effluent from the second reactor to an autothermal reformer ("Secondary Reformer"; see Fig. 13, pages 100-102, Section 6.1); and
- withdrawing from the autothermal reformer a hot gas stream of product gas rich in hydrogen and carbon monoxide (Fig. 13 and page 101, lines 18-20);
- wherein the steam reforming catalyst comprises nickel and/or noble metal (page 86, Section 2 and page 91, Section 3.2).

Dybjær discloses that the first and second reactors can comprise either a tubular reactor (page 97, section 3.6), heat exchange reactor (page 97-98, section 4) and/or a fixed bed reactor (page 99-100, section 5). Further, the reference discloses that it is desired to improve thermal conductivity and efficiency of reactors used in disclosed process (page 92, lines 15-33), but the reference does not disclose said reactors having a thin film of steam reforming catalyst supported on walls of the reactors.

Igarashi et al. teaches an improved process for making of hydrogen and carbon monoxide rich gas by steam reforming wherein the process is carried out in a reactor having a thin film of steam reforming catalyst supported on walls of the reactor (abstract). The process offers improved thermal conductivity and compactness over packed bed reactors or stacked monolith reactors (column 1-2).

It would have been obvious to one having ordinary skill in the art at the time of the invention to replace the catalyst filled tubes or packed catalyst bed of the first and second reactors of Dybjær with the reactor having a thin film of steam reforming catalyst supported on walls of the

reactor, as taught by Igarashi et al., for the purpose of improving thermal conductivity and compactness of said reactor.

Double Patenting

4. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and, *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

5. Claims 1-2 are provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-4 of copending Application No. 09/743,530 in view of in view of Dybjær ("Tubular Reforming and Autothermal Reforming of Natural Gas - An Overview of Available Processes") and further in view of Igarashi et al. (USP 5,167,865).

Claims 1-4 of copending Application No. 09/743,530 recite a process for preparation of hydrogen and carbon monoxide rich gas, the process comprising the steps of passing a process gas of hydrocarbon feedstock through a first reactor in a heat conducting relationship with a hot gas stream of flue gas; passing effluent from the first reactor to a subsequent tubular reactor being provided with a thin film of steam reforming catalyst and/or steam reforming catalyst pellets and being heated by burning of fuel, thereby obtaining a partially steam reformed gas effluent and the hot gas stream of flue gas; wherein the steam reforming catalyst comprises nickel and/or noble

metal, but they do not explicitly recite the process further comprising passing the effluent from the second reactor to an autothermal reformer. Additionally they do not explicitly recite the first reactor having a thin film of steam reforming catalyst supported on walls of the reactor.

Dybjkær teaches a state of the art process for preparation of hydrogen and carbon monoxide rich gas for production of ammonia and methanol which minimizes steam requirements. Said process comprises passing a process gas of hydrocarbon feedstock through a first reactor, passing effluent from the first reactor to a subsequent tubular reactor and passing the effluent from the second reactor to an autothermal reformer (Fig. 13 and page 101, lines 18-23).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to pass the effluent from the second reactor to an autothermal reformer in the process recited in claims 1-4 of copending Application No. 09/743,530, as taught by Dybjkær, for the purpose of preparing hydrogen and carbon monoxide rich gas for production of ammonia and methanol while minimizing steam production. Doing so would amount to nothing more than a use of a known apparatus for its intended use in a known environment to accomplish entirely expected result.

With respect to Igarashi et al. the same comments apply as set forth above.

Claims 1-2 of the instant application are directed to an invention not patentably distinct from invention recited in claims 1-4 of copending Application No. 09/743,530, as set forth above.

This is a provisional obviousness-type double patenting rejection.

6. Claims 1-2 are provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-9 of copending Application No. 10/667,389 in view of in view of Dybjkær ("Tubular Reforming and Autothermal Reforming of Natural Gas - An Overview of Available Processes") and further in view of Igarashi et al. (USP

5,167,865).

Claims 1-9 of copending Application No. 10/667,389 recite a process for preparation of hydrogen and carbon monoxide rich gas, the process comprising the steps of passing a process gas of hydrocarbon feedstock through a first reactor with steam reforming catalyst; passing effluent from the first reactor to a subsequent tubular reactor being provided with a steam reforming catalyst, thereby obtaining a partially steam reformed gas effluent; passing the effluent from the second reactor to an autothermal reformer; and withdrawing from the autothermal reformer a hot gas stream of product gas rich in hydrogen and carbon monoxide, but they do not explicitly recite the process wherein the steam reforming catalyst comprises nickel and/or noble metal formed as a thin film on reactor wall. Additionally they do not explicitly recite the subsequent reactor being heated by burning fuel to produce a hot gas stream of flue gas, wherein the first reactor is in a heat conducting relationship with a hot gas stream of flue gas.

Dybjkær teaches a state of the art process for preparation of hydrogen and carbon monoxide rich gas for production of ammonia and methanol which minimizes steam requirements. Said process comprises passing a process gas of hydrocarbon feedstock through a first reactor in a heat conducting relationship with a hot gas stream of flue gas; passing effluent from the first reactor to a subsequent tubular reactor being heated by burning of fuel, thereby obtaining a partially steam reformed gas effluent and the hot gas stream of flue gas; and passing the effluent from the second reactor to an autothermal reformer; wherein the steam reforming catalyst comprises nickel and/or noble metal (Fig. 13; page 91, Section 3.2; and page 101, lines 18-23).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to arrange the first reactor in a heat conducting relationship with the hot gas stream of flue gas

and to use catalyst comprising nickel and/or noble metal in the process recited in claims 1-9 of copending Application No. 10/667,389, as taught by Dybjær, for the purpose of preparing hydrogen and carbon monoxide rich gas for production of ammonia and methanol while minimizing steam production. Doing so would amount to nothing more than a use of a known apparatus for its intended use in a known environment to accomplish entirely expected result.

With respect to Igarashi et al. the same comments apply as set forth above.

Claims 1-2 of the instant application are directed to an invention not patentably distinct from invention recited in claims 1-9 of copending Application No. 10/667,389, as set forth above.

This is a provisional obviousness-type double patenting rejection.

7. Claims 1-2 are provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-8 of copending Application No. 10/667,392 in view of in view of Dybjær ("Tubular Reforming and Autothermal Reforming of Natural Gas - An Overview of Available Processes") and further in view of Igarashi et al. (USP 5,167,865).

Claims 1-8 of copending Application No. 10/667,392 recite a process for preparation of hydrogen and carbon monoxide rich gas, the process comprising the steps of passing a process gas of hydrocarbon feedstock through a first reactor with a steam reforming catalyst in a heat conducting relationship with a hot gas stream of flue gas; passing effluent from the first reactor to a subsequent tubular reactor being provided with a steam reforming catalyst and being heated by burning of fuel, thereby obtaining a partially steam reformed gas effluent and the hot gas stream of flue gas, but they do not explicitly recite the process further comprising passing the effluent from the second reactor to an autothermal reformer. Additionally they do not explicitly recite the first

reactor having a thin film of steam reforming catalyst comprising nickel and/or noble metal supported as thin film on walls of the reactor.

Dybjkær teaches a state of the art process for preparation of hydrogen and carbon monoxide rich gas for production of ammonia and methanol which minimizes steam requirements. Said process comprises passing a process gas of hydrocarbon feedstock through a first reactor, passing effluent from the first reactor to a subsequent tubular reactor and passing the effluent from the second reactor to an autothermal reformer, wherein the steam reforming catalyst comprises nickel and/or noble metal (Fig. 13; page 91, Section 3.2; and page 101, lines 18-23).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to pass the effluent from the second reactor to an autothermal reformer and to use steam reforming catalyst comprising nickel and/or noble metal in the process recited in claims 1-8 of copending Application No. 10/667,392, as taught by Dybjkær, for the purpose of preparing hydrogen and carbon monoxide rich gas for production of ammonia and methanol while minimizing steam production. Doing so would amount to nothing more than a use of a known apparatus for its intended use in a known environment to accomplish entirely expected result.

With respect to Igarashi et al. the same comments apply as set forth above.

Claims 1-2 of the instant application are directed to an invention not patentably distinct from invention recited in claims 1-8 of copending Application No. 10/667,392, as set forth above.

This is a provisional obviousness-type double patenting rejection.

8. Claims 1-2 are provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-7 of copending Application No. 10/668,295 in view of in view of Dybjkær ("Tubular Reforming and Autothermal Reforming of

Natural Gas - An Overview of Available Processes”).

Claims 1-7 of copending Application No. 10/668,295 recite a process for preparation of hydrogen and carbon monoxide rich gas, the process comprising the steps of passing a process gas of hydrocarbon feedstock through a first reactor with a thin film of steam reforming catalyst on the reactor wall and in a heat conducting relationship with a hot gas stream of flue gas; passing effluent from the first reactor to a subsequent tubular reactor being provided with a steam reforming catalyst and being heated by burning of fuel, thereby obtaining a partially steam reformed gas effluent and the hot gas stream of flue gas, but they do not explicitly recite the process further comprising passing the effluent from the second reactor to an autothermal reformer. Additionally they do not explicitly recite the steam reforming catalyst comprising nickel and/or noble metal.

Dybjkær teaches a state of the art process for preparation of hydrogen and carbon monoxide rich gas for production of ammonia and methanol which minimizes steam requirements. Said process comprises passing a process gas of hydrocarbon feedstock through a first reactor, passing effluent from the first reactor to a subsequent tubular reactor and passing the effluent from the second reactor to an autothermal reformer, wherein the steam reforming catalyst comprises nickel and/or noble metal (Fig. 13; page 91, Section 3.2; and page 101, lines 18-23).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to pass the effluent from the second reactor to an autothermal reformer and to use steam reforming catalyst comprising nickel and/or noble metal in the process recited in claims 1-7 of copending Application No. 10/668,295, as taught by Dybjkær, for the purpose of preparing hydrogen and carbon monoxide rich gas for production of ammonia and methanol while minimizing steam production. Doing so would amount to nothing more than a use of a known apparatus for its

intended use in a known environment to accomplish entirely expected result.

Claims 1-2 of the instant application are directed to an invention not patentably distinct from invention recited in claims 1-7 of copending Application No. 10/668,295, as set forth above.

This is a provisional obviousness-type double patenting rejection.

Response to Arguments

9. Applicant's arguments filed on 30 August 2004 have been fully considered but they are not persuasive.
10. The applicant argues that Igarashi et al. discloses catalyst deposited on boundary members and not on the walls of the reactor. This is found not persuasive. During examination proceedings, claims are given their broadest reasonable interpretation consistent with the specification. See *In re Graves*, 69 F.3d 1147, 1152, 36 USPQ2d 1697, 1701 (Fed. Cir. 1995). "Moreover, when interpreting a claim, words of the claim are generally given their ordinary and accustomed meaning, unless it appears from the specification or file history that they were used differently by the inventor. [Citation omitted]." *In re Paulsen*, 30 F.3d 1475, 1479, 31 USPQ2d 1671, 1674 (Fed. Cir. 1994). Instant claims 1-2 merely recite "a first reactor with a thin film of steam reforming catalyst supported on walls of the reactor". Further, the specification includes "plates with a catalyst coating, or other suitable shapes" as embodiments of the invention (see P1/L13-15). This recitation, in view of the disclosure, takes on its ordinary and accustomed meaning and does not differentiate the claimed reactor from the reactor disclosed by Igarashi et al. which comprises a boundary member between a heating area and a heated reforming area having deposition of catalytic components on the surface of the boundary member (abstract). The disclosure of the "boundary members" reads on the "walls of the reactor" of the instant claims.

11. In response to applicant's argument that there is no suggestion to combine the references, the examiner recognizes that obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. See *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988) and *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992). In this case, the suggestion to combine can be found in the references themselves. Dybjkær discloses a process for preparation of hydrogen and carbon monoxide rich gas, in the first and second reactors which, among others, can comprise a fixed bed reactor (page 99-100, section 5). Further the reference discloses that it is desired to improve thermal conductivity and efficiency of reactors used in disclosed process (page 92, lines 15-33). Igarashi et al. teaches an improved process for making of hydrogen and carbon monoxide rich gas in a reactor having a thin film of steam reforming catalyst supported on walls of the reactor (abstract). The process offers improved thermal conductivity and compactness over packed bed reactors or stacked monolith reactors (column 1-2). Therefore, it would have been obvious to one having ordinary skill in the art at the time of the invention to replace the catalyst filled tubes or packed catalyst bed of the first and second reactors of Dybjkær with the reactor having a thin film of steam reforming catalyst supported on walls of the reactor, as taught by Igarashi et al., for the purpose of improving thermal conductivity and compactness of said reactor.

12. In response to applicant's argument that the references fail to show certain features of applicant's invention, it is noted that the features upon which applicant relies (i.e., catalyst being deposited on the inner surface of a reactor tube) are not recited in the rejected claim(s). Although

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the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

13. In response to applicant's argument that neither Dybjær nor Igarashi et al. recognize some of the benefits of using a thin film of catalyst on the inner wall of a reactor, the fact that applicant has recognized another advantage which would flow naturally from following the suggestion of the prior art cannot be the basis for patentability when the differences would otherwise be obvious. See *Ex parte Obiaya*, 227 USPQ 58, 60 (Bd. Pat. App. & Inter. 1985).

14. Applicant's statement that enclosed are Terminal Disclaimers for copending application numbers 09/743,530; 10/667,389; 10/667,392; and 10/668,295 are not clear because said Terminal Disclaimers were not included to Paper filed on 30 August 2004.

Conclusion

15. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

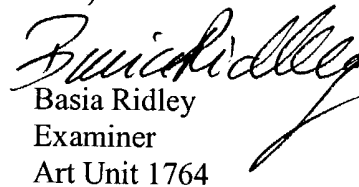
16. Any inquiry concerning this communication or earlier communications from the examiner should be directed to examiner Basia Ridley, whose telephone number is (571) 272-1453.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Glenn Caldarola, can be reached on (571) 272-1444.

The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Technical Center 1700 General Information Telephone No. is (571) 272-1700. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Questions on access to the Private PAIR system should be directed to the Electronic Business Center (EBC) at (866) 217-9197 (toll-free).


Basia Ridley
Examiner
Art Unit 1764

BR

November 29, 2004